

**CLAIMS:**

1. A method generating stimuli by an auditory prosthesis, including an array of stimulation devices in response to an incoming acoustic signal, the method including:

5 determining stimulation devices to be activated within the array and activation times for those electrodes; and

applying a temporal adjustment to the activation times such that activation of devices representing lower-amplitude components of the signal is delayed relative to activation of a proximate device representing a higher-amplitude  
10 component of the signal.

2. A method according to claim 1, wherein the auditory prosthesis is implantable in a cochlea and forms a linear array.

3. A method according to claims 1, wherein the auditory prosthesis electrode array is implantable in an auditory brain and forms a grid mapped to the form of a  
15 linear array .

4. A method according to any one of the preceding claims, wherein the temporal adjustment applied to the activation time of stimulation device is derived from the amplitudes of stimuli to be applied by proximate stimulation devices.

5. A method according to claim 4, wherein the activation time of each  
20 stimulation device is temporally adjusted according to a latency function whereby, for a particular device, a temporal adjustment is applied if the weighted sum of the amplitudes of proximate stimuli exceeds the weighted amplitude of the stimuli to be applied by the particular device.

6. A method according to claim 5, wherein the latency function defines a Mexican-hat shape centred on the stimuli to be applied by the proximate device, with the restriction of being limited to a minimum of no delay.

7. A method according to claim 6, wherein the latency function  $f_x(\vec{x})$  is  
5 defined by:

$$f_x(\vec{x}) = \min(0, -2aA_x + a \sum_{\substack{y=1 \\ y \neq x}}^N g(y)A_y)$$

where  $A_x$  is the amplitude of a stimulation to be applied by a device  $x$ ,  $a$  is a scaling factor,  $N$  is the number of devices to which the latency function is constrained, and  $g(y)$  is amplitude of a stimuli applied by device  $y$ .

10 8. A method according to any one of the preceding claims, wherein the electrode array of the auditory prostheses requires non-simultaneous stimulation to be applied by the array of stimulation devices, the method further including:

15 if there is temporal contention between stimulation to be applied by different devices of the array, discarding one or more lower-amplitude stimuli in favour of a higher-amplitude stimulus.

9. A method according to any one of claims 1 to 7, wherein the auditory prostheses requires non-simultaneous stimulation to be applied by the array of stimulation devices, the method further including:

20 if there is temporal contention between stimulation to be applied by different devices of the array, applying a further temporal delay to one or more lower-amplitude stimuli by one or more stimulation slots in favour of a higher-amplitude stimulus.

10. A method according to any one of the preceding claims, wherein array of stimulation devices includes one or more electrodes, each electrode being activated by the application of a stimulation pulse.

11. A method according to any one of claims 1 to 9, wherein the array of  
5 stimulation devices includes one or more drug delivery units for the delivery of drugs to a user at predetermined locations.

12. A method according to claim 11, wherein the drug delivery units are fluidic microchannels.

13. A system for generating stimuli for applications by an auditory prosthesis  
10 including an array of stimulation devices, including:

a stimulator unit for selectively activating stimulation devices in the array;  
and

15 a processor for processing received sound signals and controlling the operation of the stimulator unit by carrying out a method according to any one of claims 1 to 12.

14. A system according to claim 13 when dependant upon claim 10, wherein the stimulator unit acts to activate the one or more electrodes by selectively applying stimulation pulses to the electrodes.

15. A system according to claim 13 when dependant upon either one of claims  
20 11 or 12, wherein the stimulator unit includes a drug storage device and a drug delivery pump for delivering drugs stored in the drug storage device through the drug delivery units to a user.

16. A processor for use in a system for generating stimuli for application by an auditory prosthesis including an array of stimulation devices, the system including  
25 a stimulator unit for selectively activating stimulation devices in the electrode array,

the processor including digital signal processing means for processing received sound signals and controlling the operation of the stimulator unit by carrying out a method according to any one of claims 1 to 13.